SAFETY DATA SHEET
MATERIAL: CEMENT KILN & BYPASS DUST

Section 1 – Product Identification

Product Identifier
Product Name: Cement Kiln & Bypass Dust

Synonyms: Cement kiln dust, CKD, Bypass dust, BPD, kiln bypass dust, kiln dust
(This SDS covers many products. Individual constituents will vary.)

Product Form: Solid: Powder

Intended Use of Product: Cement kiln and bypass dust is a byproduct of the cement manufacturing process. It is used as a kiln feed material in cement manufacture and for soil stabilization and augmentation.

Name, Address and Telephone of Responsible Party
Holcim (US) Inc.
24 Crosby Drive
Bedford, MA 01730
(888) 646-5246

Section 2 – Hazards Identification

Classification of the Substance or Mixture

Classification (GHS-US)
Skin Corrosive 1B
Eye Damage 1
Skin Sensitization 1B
Specific Target Organ Toxicity Repeat Exposure 1
Carcinogen 2

Label Elements
Hazard Pictograms

Signal Word
Danger

Hazard Statements
Causes severe skin burns and eye damage.
Causes damage to organs (lungs) through prolonged or repeated exposure.
May cause an allergic skin reaction.
Suspected of causing cancer (lungs).

Precautionary Statements

Prevention
Do not breathe dust. Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use. Do not use until all safety precautions have been read and understood.

Response
If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a doctor.
If in eyes: Rinse cautiously with clean water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor.
If on skin: Wash with plenty of water. Take off immediately all contaminated clothing. If skin irritation or rash occurs: Immediately call a doctor.
If swallowed: Rinse mouth. Do not induce vomiting. Immediately call a poison center/doctor.

Storage
Store in an appropriate container or containment structure.

Disposal
Dispose of contents/container in accordance with local/state/national regulations.

Other Hazards
Exposure may aggravate those with pre-existing eye, skin or respiratory conditions or illness.
Section 3 – Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component/Ingredient</th>
<th>CAS #</th>
<th>Percent Present (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone (Calcium carbonate)</td>
<td>1317-65-3</td>
<td>0 - 80</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>305-78-8</td>
<td>5 - 65</td>
</tr>
<tr>
<td>Silica dioxide (Amorphous)</td>
<td>7631-86-9</td>
<td>0 - 20</td>
</tr>
<tr>
<td>Gypsum (Calcium sulfate)</td>
<td>13397-24-5</td>
<td>0 - 20</td>
</tr>
<tr>
<td>Sulfur trioxide</td>
<td>7446-11-9</td>
<td>1 - 12</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Iron oxide</td>
<td>1309-37-1</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Magnesium oxide</td>
<td>1309-48-4</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Nuisance dusts (particulate not otherwise regulated/PNOR)</td>
<td>none</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Crystalline silica (Quartz)</td>
<td>14808-60-7</td>
<td>0.1 - &lt; 1</td>
</tr>
</tbody>
</table>

Other Components
Clinker kiln dust (CKD) and bypass dust (BPD) have variable compositions depending upon the cementitious products produced in the cement kiln. Cement is made from materials mined from the earth and processed using energy provided by various fuels. Additional materials such as fly ash and metallic slag may also be introduced into the cement manufacturing process. A chemical analysis of CKD/BPD may reveal trace amounts of naturally occurring but potentially harmful chemical compounds such as crystalline silica, organic compounds, potassium and sodium compounds, heavy metals including cadmium, chromium (including hexavalent chromium), nickel and lead depending on the source of the raw materials and fuels.

Section 4 – First Aid Measures

Description of First Aid Measures

**Eyes**  
Rinse eyes and under lids cautiously with clean water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

**Skin**  
Remove contaminated clothing. Remove material from skin, but avoid creating dust. Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention.

**Inhalation**  
Remove person to fresh air away from dust and keep comfortable for breathing. Get medical attention.

**Ingestion**  
Do not induce vomiting. If subject is conscious, rinse the mouth with water to remove any material and drink plenty of water to dilute any swallowed material. Do not give drink or attempt to force water to an unconscious person. Get medical attention.

Important Symptoms and Effects (Acute and Delayed)

**Eyes**  
Redness, tearing and swelling. Causes serious eye burns and may scratch eye surface due to particle abrasion.

**Skin**  
Causes skin irritation if exposed to skin creating redness, itching and possible rash. Prolonged exposure may cause chemical burns, blistering and tissue destruction.

**Inhalation**  
Irritation of nose and throat if dust is inhaled. Prolonged or repeated inhalation of respirable dust may lead to respiratory tract and lung damage or disease.

**Ingestion**  
Irritation of mouth, throat, stomach and digestive tract if swallowed. Prolonged exposure may result in chemical burns to the mouth and esophagus.

Recommendations for Immediate Medical Care or Special Treatment

Seek immediate medical attention for inhalation of large quantities of dust or exposure of wet material over large areas of skin. Seek immediate medical attention for contact with eyes.

Section 5 – Fire Fighting Measures

**General Fire Hazards**  
None. Material is not considered flammable or combustible.

**Extinguishing Media**  
Use water or water spray to extinguish any fires involving this material.

**Extinguishing Media to Avoid**  
None.

**Hazard of Combustion**  
None.

**Fire Fighting Recommendations**  
Firefighters should always wear full protective gear to fight any fire.

Refer to Section 9 for flammability information.
Section 6 – Accidental Release Measures

Precautions: Avoid creating dust. Prevent material from entering sewers, drains, ditches or waterways.

Personal Protection: Wear respiratory protection and protective eyewear/clothing to avoid eye or skin contact.

Emergency Procedures: Ventilate area and avoid creating dust. Remove unnecessary persons from area.

Containment Procedures: Barricade solid material to prevent additional spillage.

Clean Up Procedures: Scoop or vacuum up spilled material while avoiding dust creation. Place in approved container.

Section 7 – Handling and Storage

Safe Handling Practices: Avoid contact with skin or eyes. Avoid breathing dust. Use only in well ventilated areas. Wear appropriate personal protective equipment to prevent eye or skin contact and use respiratory protection equipment if dusty or in poorly ventilated areas.

Safe Storage Measures: Store in well-ventilated areas away from moisture and incompatible materials. If stored in containers, keep containers closed when not in use.

Incompatible Materials: Water/moisture exposure will cause material to generate heat. Keep away from fluoride compounds, strong acids and oxidizers.

Section 8 – Exposure Controls & Personal Protection

Exposure Limits for Individual Components (T= Total Respirable, R=Respirable fraction, I=Inhalable-aerosol)

<table>
<thead>
<tr>
<th>Component</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>NIOSH REL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone (Calcium Carbonate)</td>
<td>15 mg/m³ (T); 5 mg/m³ (R)</td>
<td>10 mg/m³</td>
<td>10 mg/m³ (T); 5 mg/m³ (R)</td>
</tr>
<tr>
<td>Silica dioxide (Amorphous)</td>
<td>80 mg/m³ / (% SiO₂)</td>
<td>None</td>
<td>6 mg/m³</td>
</tr>
<tr>
<td>Aluminum Oxide</td>
<td>15 mg/m³ (T); 5 mg/m³ (R) (as Al)</td>
<td>1 mg/m³ (R) (as Al metal &amp; insoluble compounds)</td>
<td>Not established</td>
</tr>
<tr>
<td>Iron Oxide</td>
<td>10 mg/m³ (as fume)</td>
<td>5 mg/m³ (R)</td>
<td>5 mg/m³ (dust/fume as Fe)</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>5 mg/m³</td>
<td>2 mg/m³</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>Gypsum (Calcium Sulfate)</td>
<td>15 mg/m³ (T); 5 mg/m³ (R)</td>
<td>10 mg/m³ (T)</td>
<td>10 mg/m³ (T); 5 mg/m³ (R)</td>
</tr>
<tr>
<td>Crystalline Silica (Quartz)</td>
<td>10 mg/m³ (R) / (% SiO₂ + 2); 30 mg/m³ (T) / (% SiO₂ + 2)</td>
<td>0.025 mg/m³ (R)</td>
<td>0.05 mg/m³ (R)</td>
</tr>
<tr>
<td>Magnesium oxide</td>
<td>15 mg/m³</td>
<td>10 mg/m³ (I)</td>
<td>Not established</td>
</tr>
<tr>
<td>Sulfur trioxide</td>
<td>1 mg/m³ (as H₂SO₄)</td>
<td>0.2 mg/m³ (as H₂SO₄)</td>
<td>1 mg/m³ (as H₂SO₄)</td>
</tr>
<tr>
<td>Nuisance dusts (PNOR)</td>
<td>15 mg/m³ (T); 5 mg/m³ (R)</td>
<td>10 mg/m³</td>
<td>Not established</td>
</tr>
</tbody>
</table>

Exposure Controls:

Engineering Controls: Use outdoors or in well-ventilated areas. Employ natural or mechanical ventilation to maintain exposure within applicable limits.

Personal Protection:

Face and Eyes: Safety glasses with side shields or protective goggles should be worn while using this product. For extremely dusty conditions, non-vented goggles or goggles with indirect venting are recommended. Avoid contact lens wear when using this product.

Body: Long sleeved shirts and trousers should be worn while using this material. Avoid direct contact with skin. If working in dusty conditions, impervious over garments are recommended.

Respiratory: If exposure levels cannot be maintained below acceptable limits, suitable particulate-filtering facemasks or respirators approved by MSHA/NIOH should be worn in accordance with the user’s respiratory protection program and OSHA/MSHA guidelines.

Hands: Protective gloves with wrist/arm cuffs should be worn to avoid direct contact with skin.

Section 9 – Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Solid, powder, powder</td>
</tr>
<tr>
<td>Appearance &amp; Color</td>
<td>Tan/grey/off-white powder</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
</tr>
<tr>
<td>pH</td>
<td>&gt;11 (in water)</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>&gt;1000°C</td>
</tr>
<tr>
<td>Solubility (Water)</td>
<td>2 – 20%</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>2.6 – 2.8</td>
</tr>
<tr>
<td>Flash Point/Method</td>
<td>None. Not flammable.</td>
</tr>
<tr>
<td>Auto Ignition Temperature</td>
<td>Not determined</td>
</tr>
<tr>
<td>Lower Flammability Limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Flammability Limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Octanol/H₂O Coefficient</td>
<td>Not determined</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Solid at room temperature</td>
</tr>
<tr>
<td>Explosion Risk: Static</td>
<td>Not considered a hazard</td>
</tr>
<tr>
<td>Explosion Risk: Shock</td>
<td>Not considered a hazard</td>
</tr>
</tbody>
</table>
Section 10 – Stability and Reactivity

Reactivity
Reacts with water to form calcium hydroxide which can irritate/damage skin and eyes.

Chemical Stability
Stable at standard temperature and pressures.

Hazardous Reactions
None. Hazardous polymerization will not occur.

Conditions to Avoid
Moisture or wetting may cause exothermic heating as product cures.

Incompatible Materials
Avoid contact with strong acids, aluminum metal and oxidizers.

Decomposition Hazards
None identified.

Section 11 – Toxicological Information

Product: Cement Kiln & Bypass Dust

Acute Toxicity
Not classified.

LD50/LC50 Data
Not classified.

Skin Corrosion/Irritation
Causes skin irritation and burns if exposed to moisture on skin.

Critical Eye Damage/Irritation
Causes serious eye injury due to chemical burns or mechanical irritation.

Respiratory or Skin Sensitization
Material may contain trace amounts of hexavalent chromium which can cause skin sensitization, allergic reactions and rash in some individuals.

Germ Cell Mutagenicity
Not reported/no data available.

Teratogenicity
Not reported/no data available.

Carcinogenicity
Material may contain trace amounts of crystalline silica, which may cause lung cancer through repeated or prolonged exposure to dust.

Specific Organ Toxicity (Single Exposure)
Not reported/no data available.

Specific Organ Toxicity (Repeated Exposure)
May cause damage/disease to lungs through repeated or prolonged exposure.

Reproductive Toxicity
Not reported/no data available.

Aspiration Respiratory Hazard
Irritation of nose and throat. Coughing, sneezing, dyspnea and mucous discharge. Extended contact may lead to chemical burns.

Symptoms: Skin Contact
Redness and itching and possible rash. Extended contact may lead to chemical burns, blistering and destruction of tissue.

Symptoms: Eye Contact
Redness and itching. Extended contact may lead to chemical burns, corneal abrasion and ulceration.

Symptoms: Ingestion
Irritation of mouth and throat. Extended contact may lead to chemical burns.

Other Toxicological Information
No additional data available.

Components
Silica dioxide (Amorphous)  Oral LD50 Rat >5000 mg/kg
Inhalation LC50 Rat >2.2 mg/L (1 h)
Dermal LD50 Rabbit >2000 mg/kg
Group 3  Not listed  Not listed
Limestone (Calcium carbonate)  Oral LD50 Rat 6450 mg/kg
Not listed  Not listed  Not listed
Aluminum Oxide  Oral LD50 Rat >5000mg/kg
Not listed  Not listed  Not listed
Iron Oxide  Oral LD50 Rat >10000 mg/kg
Group 3  Not listed  Not listed
Calcium oxide  Oral LD50 Rat 500 mg/kg
Not listed  Not listed  Not listed
Gypsum (Calcium Sulfate)  Oral LD50 Rat >2000 mg/kg
Not listed  Not listed  Not listed
Crystalline Silica (Quartz) (refer to Section 16 for more information)  Oral LD50 Rat >22,500 mg/kg
LC50 Carp >10,000 mg/L (72 h)
Group 1  Known  Not listed
Magnesium oxide  Oral LD50 Rat 810 mg/kg
Not listed  Not listed  Not listed
Sulfur trioxide  LC50 Rat 1375 mg/m3 (1 h) (as H2SO4)
Not listed  Not listed  Not listed
Nuisance Dusts (PNOR)  No data  Not listed  Not listed

Section 12 – Ecological Information

General Ecotoxicity
Not classified. Product may have long-term adverse aquatic organism impact.

Persistence and Degradability
Not reported/no data available.

Bioaccumulation Potential
Not reported/no data available.

Mobility in Soil to Groundwater
Not reported/no data available.

Environmental Fate
Not reported/no data available.

Other Environmental
Prevent material from entering sewers, drains, ditches or waterways.

Precautions or Information

**Section 13 – Disposal Considerations**

**Disposal Methods**
Dispose as an inert, non-metallic mineral in accordance with applicable federal, state, and local regulations.

**Special Considerations**
Avoid creation or breathing dust during disposal. Avoid contact with skin and eyes. Refer to Section 8 for personal protection information.

**Other Disposal Information**
Prevent material from entering sewers, drains, ditches or waterways.

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**Section 14 – Transport Information**

**Proper Shipping Name**
N/A – not regulated.

**Hazard Class**
N/A – not regulated.

**UN Shipping ID Number**
N/A – not regulated.

**Packing Group**
N/A – not regulated.

**Environmental/IMDG Codes**
N/A – not regulated.

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**Section 15 – Regulatory Information**

**Federal**
This product contains one or more chemical components or ingredients that may require identification and/or reporting under SARA Section 302, SARA Section 311/312/313, CERCLA and/or TSCA. An examination of the components of this product should be conducted by a qualified environmental professional to determine if such identification or reporting is required by federal law.

- Components: Silica (Crystalline), Silica dioxide (Amorphous), Sulfur trioxide, Aluminum oxide, Calcium oxide, Iron oxide

**State**
This product contains one or more chemical components or ingredients that are included or listed on the hazardous substances lists for one or more of the following states: California, Maine, Minnesota, New Jersey, Pennsylvania and Rhode Island. An examination of the components of this product should be conducted by a qualified environmental or safety and health professional to determine the specific requirements for those states.

- Components: Silica (Crystalline), Silica dioxide (Amorphous), Calcium carbonate, Sulfur trioxide, Aluminum oxide, Calcium oxide, Iron oxide

The state of California requires the following statement (Proposition 65) in regards to this material:

- WARNING! This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

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**Section 16 – Other Information**

**Date of last revision:** May 20, 2015

**Prepared and reviewed by:** Holcim (US) Inc. Occupational Safety & Health

**Additional information regarding crystalline silica:**
The major concern is silicosis, caused by the inhalation and retention of respirable (extremely small) crystalline silica dust particles. Silicosis can exist in several forms. Chronic or ordinary silicosis (often referred to as simple silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low concentrations of airborne respirable crystalline silica dust. Complicated silicosis or progressive massive fibrosis (PMF) may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease. Acute silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis can be fatal.

IARC: The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs."

NTP: The National Toxicology Program (NTP), in its Thirteenth Annual Report on Carcinogens, classified "silica, crystalline (respirable)" as a known human carcinogen.

OSHA: Crystalline silica (quartz) is not regulated as a human carcinogen by the Occupational Safety and Health Administration.
Other important information:
While the information provided in the safety data sheet is believed to provide a useful summary of the hazards of fly ash, the information in this document cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

The data furnished in this sheet do not address hazards that may be posed by other materials when mixed with fly ash. Users should review other relevant material safety data sheets before working with this product.

The information presented in the Safety Data Sheet is based on current knowledge and publications and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be interpreted as guaranteeing any specific property of the product.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HOLCIM (US) INC., EXCEPT THAT THE PRODUCT SHALL CONFORM TO CONTRACTED SPECIFICATIONS.

--END OF SAFETY DATA SHEET--